STATEMENT OF WORK

TWO MILE WASH RESTORATION
KAIBAB, ARIZONA

DIVISION 1 -- GENERAL REQUIREMENTS

SECTION 1.1 -- GENERAL

1.1.1. The Requirement

It is required that there be constructed and completed, in accordance with the contract clauses, these specifications, and drawings, hereof, restoration of Two Mile Wash.

The work is located on the Kaibab Paiute Indian Reservation, Arizona, approximately 15 miles west of Fredonia, Arizona.

1.1.2. Description of the Work

The principle features of the work include:

a. Excavation for slope stabilization and access.

b. Excavation for infiltration gallery and pre-cast diversion box.

c. Formwork, reinforcement, and concrete placement of cutoff barriers for infiltration gallery.

d. Installation of pre-cast diversion box.

e. Installation of gravel and riprap.

f. Excavation, trenching, and installation of diversion pipe.

g. Excavation to refurbish existing impoundment.

h. Spreading and leveling spoils materials.

i. Revegetating disturbed areas with native grasses.

1.1.3. Staking Out Work

a. Lines and grades.--The Contracting Officer will establish lines and grades required for proper execution of the work.

The Contractor shall give such assistance and provide such drill holes, forms, ladders, spikes, nails, and light as may be required by the Contracting Officer in establishing lines and grades.

The Contractor shall adjust its construction operations at such points and for such reasonable time as may be necessary to assist with the work of transferring lines and marking points for line and grade.

The Government will provide only the minimum of survey crew services essential to orderly performance of the work, the Government survey crews will not be available at all times for the work under these specifications. The Contractor shall keep the Contracting Officer advised on a current basis of construction survey requirements so that survey work may be coordinated with the Contractor's sequence of operations.

b. Replacement of survey stakes.--Where construction operations require removal of the Government's stakes or other survey marks, the Contractor shall reference such points in an approved manner. Survey stakes or marks established by the Government shall be preserved by the Contractor unless he is authorized to remove them; and in case of their destruction or removal by the Contractor's forces, they will be replaced by the Government at the Contractor's expense. The actual cost to the Government of replacing survey stakes or marks will be deducted from payments due the Contractor.

c. Cost.--The cost of furnishing all necessary materials and performing all work required by the Contracting Officer in establishing lines and grades as described in this paragraph shall be included in the prices bid in the schedule for other items of work.

1.1.4. Submittal Requirements

a. General.--The Contractor shall furnish all materials and perform all work required for furnishing submittals to the Government, in the accordance with clause FAR 52.236-21 Specifications and Drawings for Construction; this paragraph; Table 1A (List of Submittals); and the requirements in the provisions, clauses, and paragraphs of this solicitation/specifications.

The word "submittals" shall be interpreted to include drawings, data, manuals, certifications, samples, color chips or charts, brochures, and other items furnished by the Contractor for approval, informational, and other purposes.

b. List of Submittals.--Table 1A (List of Submittals), lists the submittals required by this solicitation/specifications except those submittals which are required conditionally, required by entities other than the Bureau of Reclamation, or which are periodic in nature. Any submittal required to be submitted by the Contractor but which is not listed in the table shall be submitted in accordance with the applicable requirements of this solicitation/ specifications. In case of a conflict between the requirements of this paragraph and the requirements included elsewhere in this solicitation/ specifications, the requirements elsewhere shall take precedence over the requirements contained in this paragraph.

c. Submittals.--Each item in Table 1A (List of Submittals) has been assigned an RSN (Required Submittal Number). The "Submittals required" column of the table specifies the material to be submitted for each RSN. All of the material specified for an RSN will be

considered a complete set; and where the material required for an RSN is specified as separate or distinguishable parts, a complete set shall include all parts. Only complete sets shall be submitted.

The number of complete sets to be submitted, and the location to which they are to be sent, shall be in accordance with the "No. of sets to be sent to:" column of the table, except as provided below for sets of original material.

When an RSN involves submittal of original (non-copied) material, all original material, or as much thereof as necessary to form a complete set, shall be included in just one complete set. This "originals" set shall be sent to the proper address, given in subparagraph e. below, as determined by the "Responsible code" column of the table and the following:

(1) CO indicates Contracting Officer

(2) PCE indicates Project Construction Engineer.

The "originals" set shall be counted as one of the complete sets required to be submitted under the "no. of sets to be sent to:" column of the table.

For each RSN, the Contractor shall submit complete sets of required submittal material under the cover of a transmittal letter. At the Contractor's option, complete sets for more than one RSN may be submitted under cover of the same transmittal letter, provided they have the same responsible code designation as shown in the table. The Contractor's transmittal letter shall include:

(1) Reference to Bureau of Reclamation contract/specifications numbers and title.

(2) Identification of responsible code as shown in the table.

(3) Complete list of RSN(s) for which material is being submitted.

(4) For each RSN, number of complete sets and list of materials included.

(5) For each RSN, identification of the submittal as an initial submittal or a resubmittal.

Each drawing submitted by the Contractor shall have the Contractor's or supplier's title and drawing number on it. Drawings and data shall be labeled with the Bureau of Reclamation solicitation/specifications numbers and the schedule item number.

Manufacturer's data for commercial products or equipment, such as catalog cut sheets, shall be clearly marked to indicate the item(s) to be furnished. The data shall be sufficiently comprehensive to identify the manufacturer's name, type, model, size, and characteristics of the product or equipment, as well as the fully demonstrate that the product or equipment meets the requirements of these specifications.

Submittals requiring certification by a registered professional shall be signed and sealed.

d. Review of submittals furnished for approval.--The time required for review of each submittal furnished under an RSN for approval will not begin until the Government receives complete sets of all the submittal materials required for that particular RSN. The number of calendar days required for review of drawings or data submitted or resubmitted for approval will include the date the drawings or data are received by the Government, and will extend through the date of return mailing to the Contractor.

Except as otherwise provided in the specifications for specific submittals, the Government will require 30 calendar days for review of each submittal or resubmittal furnished by the Contractor for approval, and this review time will apply to each separate submittal or resubmittal whether the submittals are approved, not approved, or returned for revision.

If the Government uses time in excess of the specified number of calendar days for review of any submittal or resubmittal, additional time, not to exceed the excess time, will be added to the time allowed the Contractor for completion of the work affected by such excess time, to the extent it is demonstrated that the excess time caused delay. If the Government's review of two or more separate submittals or resubmittals is late and results in concurrent days of excess time, such days will be counted only once in computing an extension of the completion date. Further, if the Contractor fails to make complete approval submittals in the sequence and within the time periods specified in this solicitation/specifications, and thus precludes the Government from approving or considering for approval such submittals within the specified calendar day period, then the Contractor shall not be entitled to an extension of time allowed for completion of the work.

Unless otherwise specified, one set of the submittals required for approval will be returned to the Contractor either approved, not approved, or conditionally approved, and will be marked to indicate changes, if required. Submittals that are not approved or that require changes or revisions shall be revised and resubmitted for approval, and shall show changes and revisions with revision date. All requirements specified for the initial submittal shall apply to any resubmittals required. Unless otherwise specified, all submittals which are to be resubmitted shall be resubmitted by the Contractor within 40 calendar days after the Contractor has received the Government's comments.

e. Addresses.--The Contractor shall submit the submittals to the applicable addresses listed below as required by Table 1A (List of Submittals).

The Contractor shall also send a copy of the transmittal letter to each of the addresses listed below that are not sent the submittal. Submittals shall be submitted as required by Table 1A (List of Submittals) to:

1. Bureau of Reclamation
   Contracting Officer, LC-3111
   P.O. Box 61470
   Boulder City NV 89006-1470

2. Bureau of Reclamation
   Project Construction Engineer, Attn: LC-6210
   P.O. Box 61470
   Boulder City, NV 89006-1470

f. Cost.--Unless otherwise specified, no separate payment will be made for preparing and furnishing submittals to the Government, and the cost thereof shall be included in the prices bid in the schedule for the applicable items of work requiring the submittals or other items of work.

SUBMITTALS

TWO MILE WASH RESTORATION
KAIBAB, ARIZONA

Table 1A - List of Submittals

RSN	Item	Reference Provision, Clause or Paragraph	Respon-sible Code	Submittals Required	No. of sets to be sent to:*		Due Date or Delivery Time
					CO	PCE	
MS1	Materials Specifications	2.1.3.a	PCE	Riprap standards	0	1	5 working days prior to use on site.
MS2	Material Specifications	2.1.3.b	PCE	Geotextile description and sample	0	1	5 working days prior to use on site.
MS3	Material Specifications	2.2.3.b	PCE	Description of gallery liner	0	1	5 working days prior to use on site.
MS4	Material Specifications	2.2.3.c	PCE	Geotextile description and sample	0	1	5 working days prior to use on site.
MS5	Material Specifications	2.2.3.d	PCE	Description and specifications of gravel	0	1	5 working days prior to use on site.
MS6	Material Specifications	2.3.2.c	PCE	Pipe specifications	0	1	5 working days prior to use on site.
007	Liability Insurance	DOI 1452.228-70	CO	Acceptable evidence showing that insurance has been obtained.	1	0	Prior to commencement of work under this contract.
008	Insurance - work on a Government installation	52.228-5	CO	Written certification that the required insurance has been obtained.	1	0	Prior to commencement of work under this contract.
009	Safety and Health	WBR 1452.223-81	CE	Safety Program.	0	2	Submitted and accepted before commencing onsite work.
010	Performance and Payment Bonds	52.228-15	CO	Bonds	1	0	Within 15 days after award.
011	Release of Claims	DOI 1452.204-70	CO	Release of Claims (DI-137) against the United States	1	1	After completion of the work and prior to final payment.

* CO indicates Contracting Officer and PCE indicates Project Construction Engineer. For mailing addresses, see subparagraph entitled "Addresses" of paragraph entitled "Submittal Requirements."

SECTION 1.2--MATERIALS

1.2.1. Materials to be Furnished by the Contractor

a. General.--The Contractor shall furnish all materials required for completion of the work.

The words "material" or "materials" as used in these specifications to denote items furnished by the Government or the Contractor shall be construed to mean equipment, machinery, product, component, or any other item required to be incorporated in the work.

When a separate item which includes the furnishing of any material is provided in the schedule, the cost of furnishing, hauling, storing, and handling shall be included in the price bid for that item. When a separate item is not provided in the schedule for furnishing any material required to be furnished by the Contractor, the cost of furnishing, hauling, storing, and handling shall be included in the price bid for the work for which the material is required.

Materials furnished by the Contractor shall be of the type and quality described in these specifications. The Contractor shall make diligent effort to procure the specified materials from any and all sources, but where because of Government priorities or other causes, materials required by the specifications become unavailable, substitute materials may be used: Provided, that no substitute materials shall be used without prior written approval of the Contracting Officer, said written approval to state the amount of the adjustment, if any, to be made in favor of the Government. The Contracting Officer's determination as to whether substitution shall be permitted and as to what substitute materials may be used shall be final and conclusive. If the substitute materials approved are of less value to the Government or involve less cost to the Contractor than the materials specified, an adjustment shall be made in favor of the Government, and where the amount involved or the importance of the substitution warrants, a deductive modification to the contract will be issued. No payments in excess of prices bid in the schedule will be made because of substitution of one material for another or because of the use of one alternate material in place of another.

b. Inspection of materials.--Materials furnished by the Contractor which will become a part of the completed construction work shall be subject to inspection in accordance with FAR clauses 52.236-5 Material and Workmanship and 52.246-12 Inspection of Construction at any one or more of the following locations, as determined by the Contracting Officer: At the place of production or manufacture, at the shipping point, or at the site of the work. To allow sufficient time to provide for inspection, the Contractor shall submit to the Contracting Officer, at the time of issuance, copies in triplicate of purchase orders, including drawings and other pertinent information, covering materials on which inspection will be made as advised by the Contracting officer, or shall submit other evidence in the event such purchase orders are issued verbally or by letter.

The inspection of materials at any of the locations specified above or the waiving of the inspection thereof shall not be construed as being conclusive as to whether the materials and equipment conform to the contract requirements under clause FAR 52.246-12 Inspection of Construction, nor shall the Contractor be relieved thereby of the responsibility for furnishing

materials meeting the requirements of these specifications. Acceptance of all materials will be made only at the site of the work.

1.2.2. Materials and Workmanship - Reclamation

a. Materials.--In accordance with clause FAR 52.236-5 Material and Workmanship, all materials furnished by the Contractor shall be new and of the most suitable grade for the purpose intended considering strength, ductility, durability, and best engineering practice.

Except as specified, materials shall conform to Federal specifications or standards, or, if there are no applicable Federal specifications or standards, materials shall conform to the specifications or standards of ANSI (American National Standards Institute), ASTM (American Society for Testing and Materials), ASME (American Society of Mechanical Engineers), SAE (Society of Automotive Engineers), IEEE (Institute of Electrical and Electronic Engineers), NFPA (National Fire Protection Association), or other nationally recognized standards organization. If the Contractor proposes to deviate from, or to use materials not covered by, the aforementioned specifications and standards, the Contractor shall submit, for approval, the justification for and exact nature of the deviation, and complete specifications for the materials proposed for use.

Parts shall be made accurately to standard gauge where possible. Threads, including but not limited to those of bolts, nuts, screws, taps, pipes, and pipefittings shall be unified screw threads conforming to ASME B1.1 or B1.20.1. For internal connections only, the Contractor will be permitted to deviate from the ASME standards, provided the Contractor furnishes a complete set of taps and dies as might be required to facilitate repair or replacement.

All fasteners shall be permanently marked with a symbol identifying the manufacturer and with symbol(s) indicating grade, class, type, and other identifying marks in accordance with reference or applicable standards.

b. References. - The publications listed below form a part of this specification to the extent referenced.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

Standard	Title
ASME B1.1-1989	Unified Inch Screw Threads (UN and UNR Thread Form)
ASME B1.20.1-1983 (R1992)	Pipe Thread, General Purpose (Inch)

b. Workmanship.--The Contractor shall be responsible for the accurate manufacture and fabrication of materials in accordance with best modern practice and the requirements of these specifications, notwithstanding minor errors or omissions therein.

Liberal factors of safety and adequate shock-absorbing features shall be used throughout designs, especially for parts subjected to variable stress or shock, including alternating or vibrating stress or shock. Shock-absorbing features and parts subject to vibration shall include provisions which prevent components from loosening.

1.2.3. Reference Specifications and Standards

Materials, Contractor design, construction work, and other requirements which are specified by reference to Federal Specifications, Federal Standards, or other standard specifications or codes shall comply with the editions or revisions listed. In the event of conflicting requirements between referenced specifications, standards, or codes and these specifications, these specifications shall govern.

In the event that materials are not covered by Federal or other specifications, the materials furnished shall be of standard commercial quality.

Copies of Federal Specifications and standards may be obtained from GSA Federal Supply Service Bureau. See the provision at FAR 52.211-1, "Availability of Specifications Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29." Many of the Federal Specifications and Standards may be examined at the Bureau of Reclamation Denver Office Library, Building 67, Denver Federal Center, West 6th Avenue and Kipling Street, Denver, Colorado.

Addresses for obtaining some industrial and governmental (other than Federal and Bureau of Reclamation specifications and standards) specifications, standards, and codes are listed in the provision at FAR 52.211-3 "Availability of Specifications Not Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions."

The Contractor shall maintain onsite, a copy of referenced specifications and standards related to work proceeding at the jobsite while the work is being performed. These shall be available for use by the Government.

SECTION 1.3--LOCAL CONDITIONS

1.3.1. Access to the Work

a. General.--Rights-of-way for access to the work from existing roads will be provided by Reclamation. All work on the rights-of-way necessary for access to the site shall be performed by the Contractor.

The Contractor shall make its own investigation of the condition of available public or private roads and of clearances, restrictions, bridge-load limits, bond requirements, and other limitations that affect or may affect transportation and ingress and egress at the jobsites. Subject to the clause at FAR 52.249-10 Default (Fixed-Price Construction), the unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages

or extension of time for completion of work. It shall be the Contractor's responsibility to construct and maintain, at its own expense and at its own risk, any haul roads, access roads, bridges, or drainage structures required for construction operations.

b. Existing roads.--The Contractor shall meet all conditions imposed upon the use of existing roads by the controlling agency; including seasonal, weight, or other limitations or restrictions; payment of excess size and weight fees; and posting of bonds.

c. Haul routes.--The hauling of sand, gravel, earth materials, or other intrajob hauling, over public highways, roads, or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic. Where haul routes cross public highways or roads, the Contractor shall provide barricades, flagmen, and other necessary precautions for safety of the public as provided in Paragraph 1.4.1. (Safety of the Public).

d. Cost.--The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

1.3.2. Use of Land for Construction Purposes

a. General.--The Contractor will be permitted to use Tribal land, controlled by the Kaibab Paiute Indian Tribe, for field offices, construction plants and buildings, storage yards, shops, roads, spoil areas, and other construction facilities required for construction purposes. Before any excavation or construction is performed at the site, the Contractor must obtain clearance from the Tribal representative.

If private land is used by the Contractor for construction facilities or other purposes, the Contractor shall make all necessary arrangements with the owner and shall pay all rentals or other costs connected therewith.

b. Tribal land.--The Contractor's use of Tribal land for construction purposes shall be subject to the requirements of the FAR clauses 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements, 52.236-10 Operations and Storage Areas, 52.236-12 Cleaning Up, and other applicable contract clauses, SECTION 1.5 - Environmental Quality Protection of these specifications, and to the requirements of this paragraph. Such use shall not interfere with any part of the work under this contract, nor with the work of other contractors or the Tribe in the vicinity, nor with reservations made, or as may be made, by the Tribe for the use of such land.

The Contractor's construction facilities shall be arranged and operated in a manner to preserve and protect existing features, trees, and vegetation to the maximum extent practicable. The location, construction, operation, maintenance, and removal of construction facilities on Tribal land shall be subject to the approval of the Contracting Officer.

Housing for Contractor personnel will not be permitted on Tribal land.

Upon completion of the work, and following removal of construction facilities and required cleanup, Tribal land used for construction purposes and not required for the completed installation shall be regraded in accordance with Paragraph 1.5.1 (Landscape Preservation).

c. Cost.--No charge will be made to the Contractor for the use of Tribal land for construction purposes. All work required by this paragraph shall be at the expense of the Contractor.

1.3.3. Electric Power for Construction Purposes

The Contractor shall make all necessary arrangements and shall provide all electric power required for construction purposes, including providing any temporary transmission lines, distribution circuits, transformers, and other electrical equipment required for distributing the power to the place or places of use by the Contractor. In lieu of temporary power lines, portable generators of adequate size may be utilized as a temporary power source.

At the termination of the contract under these specifications, the Contractor shall dismantle and remove all distribution lines serving the Contractor's installations, or those of subcontractors, that are not part of the permanent power installation.

No direct payment will be made to the Contractor for providing electric power for construction purposes, and the cost thereof shall be included in the prices bid in the schedule for other items of work.

1.3.4. Water for Construction and Dust Abatement

The Contractor shall furnish all water required for construction and dust abatement purposes. The Contractor shall make all arrangements for obtaining water and provide all means for conveying water to points of use. The Contractor shall coordinate with the Tribe to assure the availability of water or shall provide an alternate source.

b. Cost. - The cost of furnishing water and of providing necessary facilities and conveying water to points of use shall be included in the prices bid in the schedule for other items of work.

SECTION 1.4--SAFETY

1.4.1. Safety of the Public

The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient flasher lights, flagmen, danger signals, and signs, and shall take all necessary precautions for the protection of the work and the safety of the public.

Specific signs, barricades, and flagmen requirements are detailed in sections 9 and 19 of the Bureau of Reclamation's publication "Reclamation Safety and Health Standards" and the

American National Standards Institute "Manual on Uniform Traffic Control Devices for Streets and Highways" (ANSI D6.1-1994).

The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.4.2. Submission of Material Safety Data Sheets for Hazardous Materials

After award of contract, the Contractor shall submit updated List of Hazardous Materials (LHM) and Material Safety Data Sheets (MSDS) in accordance with the requirements of paragraph (e) of the clause at FAR 52.223-3 Hazardous Material Identification and Material Safety Data.

The Contractor shall submit the updated LHM and completed MSDS and identification and certification for each material to the Bureau of Reclamation, Project Construction Engineer, Attention: LC-6210, Bureau of Reclamation, P.O. Box 61470, Boulder City, NV 89006-1470. Copies of the LHM and completed MSDS shall be submitted to the Regional Safety Engineer, Bureau of Reclamation, P.O. Box 61470, Boulder City, NV 89006-1470. The Contractor shall not deliver any hazardous material to the jobsite which was not included on the original LHM prior to acceptance of the Contractor's MSDS by the Regional Safety Engineer.

SECTION 1.5--ENVIRONMENTAL QUALITY PROTECTION

1.5.1. Landscape Preservation

The Contractor's construction facilities and operations, as well as those of persons or parties operating or associated with the Contractor, on Tribal land shall be subject to the requirements of the FAR clauses 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements, 52.236-10 Operations and Storage Areas, 52.236-12 Cleaning Up, and other applicable contract clauses, this section, and the requirements of this paragraph.

The Contractor shall exercise care to preserve the natural landscape, and shall conduct operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to prevent damage to property. When no longer required, construction roads shall be restored to original contours and made impassable to vehicular traffic.

Upon completion of the work, and following removal of construction facilities and required cleanup, Tribal land used for construction purposes and not required for the completed installation shall be regraded, as required, so that all surfaces blend with the natural terrain and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.

In accordance with the clause at FAR 52.236-10 Operations and Storage Areas, all work required by this paragraph shall be at the expense of the Contractor.

1.5.2. Protection, Repair, and Replacement of Existing Vegetation

a. Protection.--In accordance with the clause at FAR 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements, the Contractor shall preserve and protect existing vegetation not required, or otherwise authorized, to be removed. Vegetation shall be protected from damage or injury caused by Contractor construction operations, personnel, or equipment by the use of protective barriers or the methods specifically required to be removed will require prior approval by the Contracting Officer.

b. Repair or treatment.--The Contractor shall be responsible for injuries to vegetation caused by Contractor operations, personnel, or equipment. The term "injury" shall include, without limitation, bruising, scarring, tearing, and breaking of roots, trunks, or branches. Injured vegetation shall be repaired or treated without delay by the Contractor meeting the approval of the Contracting Officer.

c. Replacement.--Any tree or shrub not required or otherwise authorized to be removed that, in the opinion of the Contracting Officer, is damaged or injured beyond saving by Contractor operations, personnel, or equipment shall be removed and replaced by the Contractor. Replacement shall be of the same species, or other approved species, and of the maximum size practicable to plant and sustain in the particular environment. Replacement trees and shrubs shall be guyed as required, watered, and maintained for a period of 1 year. Any replacement tree or shrub that dies within 1 year period shall be removed and replaced by the Contractor, and such replacements shall be maintained for a period of 1 year from the date of replacement.

d. Cost.--Except as provided below, the cost of all work required by this paragraph shall be included in the prices bid in the schedule for other items of work. The repair or treatment of injured vegetation and the replacement of trees or shrubs shall be at the expense of the Contractor.

1.5.3. Protected Species

Certain native plants are considered as protected plant species by law. The Contracting Officer will ascertain which construction areas contain protected species. The Contracting Officer may arrange for removal of the protected plant species and abide by any protection plans developed by appropriate entities to avoid damage to or disturbance of any protected species.

In addition, the Contractor shall comply with any specific stipulations made by Tribal personnel that would impact protected species at the site.

The Contractor shall insert this paragraph in all subcontracts which involve the performance of work in areas where protected plant species may occur.

b, Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.4. Endangered Species

a. General.--Certain native species in the State of Arizona are Federally listed as threatened or endangered plant or animal species.

If, in the performance of this contract, evidence of the possible occurrence of any Federally listed threatened or endangered species is encountered, the Contractor shall notify the Contracting Officer immediately, giving the location and nature of the findings. The Contractor shall forward written confirmation to the Contracting Officer within two days. The Contractor shall not disturb any threatened or endangered species during construction operations, and shall provide such cooperation and assistance as may be necessary to preserve and protect the species.

Where appropriate by reason of discovery, the Contracting Officer may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

In addition, the Contractor shall comply with any specific stipulations made by Tribal personnel that would impact endangered species at the site.

The Contractor shall insert this paragraph in all subcontracts which involve the performance of work in areas where threatened or endangered species may occur.

b. Cost.--Except as provided above, the cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.5. Prevention of Water Pollution

a. General.--The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

Excavated materials or other construction materials shall not be stockpiled or deposited near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the watercourse itself.

The Contractor shall also comply with the sanitation and potable water requirements of section No. 7 of Reclamation's publication entitled "Reclamation’s Safety and Health Standards."

b. Laws, regulations, and permits.--The Contractor shall comply with applicable Federal and State laws, orders, regulations, and water quality standards concerning the control and abatement of water pollution and in the event there is a conflict between State and Federal laws, regulations, and requirements, the most stringent shall apply. Consistent violations of applicable Federal or State laws, orders, regulations, or water-quality standards shall result in the Contracting Officer stopping all site activity until compliance is assured. The Contractor shall not be entitled to any extension of time, claim for damage, or additional compensation by reason of such a work stoppage. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.

c. Cost.--Except as specified above, the cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.6. Abatement of Air Pollution

a. General.--The Contractor shall comply with applicable Federal, State, and local laws and regulations, and with the requirements of this paragraph concerning the prevention and control of air pollution. Should a conflict exist in the requirements for abatement of air pollution, the most stringent requirement shall apply. The Contractor shall utilize such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.

Equipment and vehicles that show excessive emissions of exhaust gases shall not be operated until corrective repairs or adjustments reduce such emissions to acceptable levels.

Abatement of dust pollution shall be in accordance with the applicable requirements of Reclamation's publication entitled "Reclamation’s Safety and Health Standards" and Paragraph 1.5.7. (Dust Abatement).

b. Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.7. Dust Abatement

a. General.--During the performance of work required by these specifications, or any operations appurtenant thereto, and whether on rights-of-way provided by the Tribe or elsewhere, the Contractor shall comply with applicable Federal, State, and local laws and regulations, with applicable requirements of Reclamation's publication entitled "Reclamation’s Safety and Health Standards" and with the requirements of this paragraph regarding the prevention, control, and abatement of dust pollution. Should a conflict exist in the requirements for dust abatement, the most stringent requirement shall apply. The Contractor shall be responsible for all damages resulting from dust originating from Contractor operations under these specifications in accordance with the FAR clause at 52.236-7 Permits and Responsibilities.

The Contractor shall provide labor, equipment, and materials and when required to prevent dust nuisance or damage to persons, property, or activities, including, but not limited to, crops, orchards, cultivated fields, wildlife habitats, dwellings and residences, agricultural activities, recreational activities, traffic, and similar conditions.

The Contracting Officer has the authority to stop any construction activity contributing to dust levels which are excessive or in violation of Federal, State, or local laws. All expenses resulting from such a work stoppage shall be the responsibility of the Contractor.

b. Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.8. Preservation of Historical and Archeological Data

a. General.--Federal legislation provides for the protection, preservation, and collection of scientific, prehistorical, historical, and archeological data (including relics and specimens) which might otherwise be lost due to alteration of the terrain as a result of any Federal construction project.

Should the Contractor, or any of the Contractor's employees, or parties operating or associated with the Contractor, in the performance of this contract discover evidence of possible scientific, prehistorical, historical, or archeological data, the Contractor shall immediately cease work at that location and notify the Contracting Officer, giving the location and nature of the findings. The Contractor shall forward written confirmation to the Contracting Officer within 2 days. The Contractor shall exercise care so as not to disturb or damage artifacts or fossils uncovered during excavation operations, and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

Any person who, without permission, injures, destroys, excavates, appropriates or removes any historical or prehistorical artifact, object of antiquity, or archeological resource on the public lands of the United States is subject to arrest and penalty of law.

Where appropriate by reason of discovery, the Contracting Officer may order delays in the time of performance, or changes in the work, or both. If such delays, or changes, or both, are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses of this contract.

The Contractor agrees to insert this paragraph in all subcontracts which involve the performance of work on the terrain of the site.

b. Except as provided above, the cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.9. Pesticides

a. General.--Pesticides include herbicides, insecticides, fungicides, rodenticides, piscicides, avicides, surface disinfectants, animal repellents, and insect repellents.

With the exception of insect repellents to be applied directly to clothing or skin and small quantities of aerosol insecticides, such as fly and spider sprays, to be applied within or directly to offices or shop buildings, the use of pesticides will not be allowed under this contract.

Pesticides, including insect repellents and aerosol insecticides, shall be considered harmful chemicals, and the applicable requirements of Reclamation's publication entitled "Reclamation’s Safety and Health Standards" shall apply to the storage and application of pesticides. Should a conflict exist in the requirements for dealing with pesticides, the most stringent requirement shall apply.

b. Cost.--The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.5.10. Cleanup and Disposal of Waste Materials

a. General.--The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, State, and local laws and regulations, with applicable requirements of Reclamation's publication entitled "Reclamation’s Safety and Health Standards" and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the job site.

In the event of the Contractor's failure to perform the work required by this paragraph, the work may be performed by the Government or Tribe, and the Contractor will be backcharged for the cost of such work. The Contractor's surety or sureties shall be liable for such payment until received by the Government.

b. Cleanup.--In accordance with the clause at FAR 52.236-12 Cleaning Up, the Contractor shall keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.

Upon completion of the work, and following removal of construction facilities and required cleanup, work areas shall be regraded and left in a neat manner conforming to the natural appearance of the landscape.

c. Disposal of hazardous materials.--Hazardous waste as defined by 40 CFR 261.3; Federal Standard No. 313, as amended; or other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Waste materials generated by the Contractor that may be hazardous shall be tested, and the test results shall be submitted to the Construction Engineer for review.

Waste materials known or found to be hazardous shall be disposed at an approved off-site treatment or disposal facilities. A copy of the hazardous waste manifest shall be sent to the Contracting Officer.

Waste materials discovered at the construction site shall immediately be reported to the Contracting Officer. If the waste may be hazardous, the Contracting Officer may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

d. Disposal of other waste materials.--

1. General.--Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products, shall be disposed of by the Contractor. Disposal of combustible materials shall be by removal from the construction area. Disposal of noncombustible materials shall be by removal from the construction area. Disposal of waste materials by burying will not be permitted.

2. Disposal by removal.--Waste materials to be disposed of by removal from the construction area shall be removed prior to completion of the work under these specifications. All materials removed shall become the property of the Contractor.

Where waste materials are to be disposed of, they shall be disposed of only at an approved sanitary landfill. The Contractor shall make any necessary arrangements with private parties and county officials pertinent to locations and regulations of such disposal, and shall pay any fees or charges required for such disposal.

e. Cost.--Except as provided above, the cost of cleanup and disposal of waste materials in accordance with this paragraph shall be included in the prices bid in the schedule for other items of work.

DIVISION 2 -- SITEWORK

SECTION 2.1--STREAM STABILIZATION

2.1.1. General

a. This Section covers stabilization of Moccasin Wash.

2.1.2. Stabilization

a. The bank areas of Moccasin Wash in the vicinity of the proposed diversion gallery and the downstream waterfall are to be excavated in accordance with Reclamation's publication entitled "Reclamation’s Safety and Health Standards" and to allow access to the project area.

(1) Riprap shall be placed in the channel for stabilization and erosion control as directed by the Contracting Officer or Contracting Officer’s Representative. The placed riprap shall be shaped to encourage flow in the middle of the channel.

2.1.3. Materials

a. Riprap shall be 12-inch to 24-inch diameter. The material proposed shall meet the following standards:

Parameter	Reclamation Specification
Abrasion	<40%
Specific Gravity	>2.62
Absorption	<1.5%

b. Geotextile material shall underlay all placed riprap for erosion control and be anchored or pinned as required. The material shall have a puncture rating of 135 pounds or greater and ultra-violet stability of 90% or greater. The equivalent of LINQ GTF-400E or better is acceptable.

2.1.4. Measurement and Payment

Measurement, for payment, for furnishing and placing riprap will be made by cubic yard of material which is placed.

Payment for furnishing and placing riprap will be made at the unit price per yard bid therefor in the schedule. This unit price will include all materials, labor, equipment, and incidentals required to complete the work as specified in this paragraph.

Payment for terracing, widening, and sloping Moccasin Wash for safety and access will be included in the lump sum price bid therefor in the schedule for “Slope stabilization and access, installation of diversion structures, installation of diversion pipeline.” This lump sum price will include all materials, labor, equipment, and incidentals required to complete the work as specified in this paragraph.

SECTION 2.2--STREAM DIVERSION

2.2.1. General

a. This Section covers diversion of flow from Moccasin Wash.

2.2.2. Diversion

a. The diversion of flow from Moccasin Wash consists of excavation for and installation of a diversion box, Moccasin return flow pipe, diversion pipe connection, flow infiltration gallery, manifold pipe control valves, and revegetation of disturbed areas.

Low flows (up to approximately 5-10 cfs) from Moccasin Wash are to be diverted into Two Mile Wash. Elevation difference between the proposed pipe inlet and outlet structures is approximately 30-feet over a run of approximately 1900-feet. Flows range from 1 cfs to 2000 cfs. For flows less than 10 cfs, approximately 20% of the flow is to be maintained in Moccasin Wash. Flows greater than 10 cfs are to remain in Moccasin Wash. The diversion structure will be gated to allow the diversion to be closed prior to anticipated storm events.

b. The typical infiltration gallery and manifold detail is shown on Drawing No. X-300-2125. The proposed gallery and upstream and downstream cutoff barriers will span the low flow channel width (approximately 40 feet).

The upstream cutoff barrier shall be 5.0-foot deep x 8.0-inch thick and placed below the upstream side of the gallery as shown. The upstream cutoff barrier is to be keyed into the stream embankments no less than 2.0-feet.

The downstream cutoff barrier shall be 24.0-foot x 8.0-inch and placed at a 45 degree slope. To allow for subsurface flow, the barrier shall be underlain with geotextile material. Weep holes shall be placed in the downstream cutoff barrier as directed by the Contracting Officer or Representative. The downstream cutoff barrier is to be shaped to encourage flow in the middle of the channel. The downstream cutoff barrier is to be keyed into the stream embankments no less than 4.0-feet.

The gallery shall be lined with 30 mil PVC or epdm material. The liner shall be overlain with 1.8-foot bed of clean gravel overlain by a permeable geotextile and 2-foot of 12"-24" riprap. The riprap shall be placed and shaped in a manner that encourages flows in the center of the channel. Gallery piping as shown consists of seven (7) 10" diameter slotted drain pipes at 40' lengths with 1% slope entering a common 24" manifold pipe with 0.4% slope. The gallery

piping shall be secured from floating by rot and corrosion resistant straps or cables that are anchored into the upstream and downstream cutoff barriers at 10-foot spacing.

c. The diversion box will allow for inflow from the manifold and outflow into the diversion and Moccasin return flow pipelines. Internally, the box shall be set up to allow for approximately 20% of the flows to remain in Moccasin Wash at low flows (<10 cfs). The Moccasin return flow pipeline as shown in the detail is 10" diameter with a 0.9% slope. The diversion pipeline is detailed in Section 2.3. The outflows shall have control features that allow for flows to be adjusted or turned off by responsible tribal personnel.

The diversion box shall be placed and covered in a manner that will allow valves to be safely operated during high flows and inhibit entry by livestock, debris, or sand. The restored bank line shall be compacted and riprapped to assist with stabilization.

2.2.3. Materials

a. Riprap requirements as specified in Paragraph 2.1.3 apply.

b. The gallery liner shall be 30 mil or better PVC or epdm material.

c. The geotextile fabric used within the gallery shall have a sieve size of approximately #80-#100 and flow rating of 85 gpm/ft^2. The fabric shall inhibit fine soils from entering the gallery while allowing the passage of water. LINQ GTF-160EX or its equivalent is acceptable.

d. The geotextile fabric used to underlay the downstream barrier shall have a sieve size of #70 or finer and a flow rating of 50 gpm/ft^2 or greater. LINQ GTF-125EX or its equivalent is acceptable.

e. The gravel shall be washed and screened and composed of not less than 95 percent hard, dense, nonangular, stable particles. Soluble soft materials like limestone or gypsum, soft materials, or sand will not be acceptable.

f. The diversion box shall be prefabricated concrete with a cover that is removable for maintenance access. Internally the diversion box shall be configured to provide 80% of captured flow into the diversion pipeline and 20% returned to Moccasin Wash. The box shall include and be set up with all stubbing, fittings and connections. Inflow should be stubbed for 24" piping. Diversion pipeline stubbing shall be 18" diameter. Moccasin return flow stubbing shall be 10" diameter. The tops of the inlet and outlet stubs shall be at equal height from the bottom of the box. The Contractor may propose alternate pipe diameter for the diversion and Moccasin return pipelines. The proposal shall include computations that demonstrate the ability of the pipe to meet the required carrying capacities.

g. The Contractor shall provide the required control structures and associated operators. The operator handles shall extend approximately 3-feet above the final grade over the box.

h. The Contractor shall supply all piping for the infiltration gallery, manifold, and Moccasin return flow.

2.2.4. Measurement and Payment

Payment for excavation, furnishing and installing of the infiltration gallery, manifold pipe, diversion box, Moccasin return flow pipe, and diversion pipe connection will be made at the lump sum price bid therefor in the schedule. This lump sum price will include all materials, labor, equipment, and incidentals required to complete the work as specified in this paragraph.

SECTION 2.3--DIVERSION PIPELINE

2.3.1. General

a. This Section covers the diversion pipeline from Moccasin Wash to Two Mile Wash.

2.3.2. Diversion Pipeline

a. The diversion pipeline from Moccasin Wash to Two Mile Wash consists of installation of the pipeline, clean-outs, thrust block, and riprap apron at the outfall. The alignment profile is shown on Drawing No. X-300-2126. The run is approximately 1900-feet with depth ranging from 4 to 11-feet.

b. The Contractor shall excavate the trench; provide safe access and mechanical support for pipeline installation crews; and backfill the trench. Support includes, but is not limited to, delivering pipe to the trench, mechanically lowering pipe, and other support necessary to efficiently install the pipe.

c. Pipeline configuration shall be 18" pipe with slope of 0.7% and a capacity of 8 cfs with surface clean-outs at approximately 600-700' intervals. The Contractor shall ensure that the proposed pipe meets the required size, general specifications, load bearing, and compaction requirements for the installation.

d. The Contractor shall meet the minimum safe trenching and excavation guidelines contained within the Reclamation's publication entitled "Reclamation’s Safety and Health Standards."

e. The diversion pipeline shall terminate in Two Mile Wash. The Contractor shall supply and place thrust blocks as required at pipe bends. The Contractor shall supply and place a riprap apron at the pipe outlet in Two Mile Wash to dissipate the outfall and reduce the erosional affects in the wash.

f. The Contractor shall supply and place native grass seeds in areas disturbed during construction activities.

2.3.3. Materials

a. Riprap requirements as specified in Paragraph 2.1.3. apply.

b. The Pipeline shall run from the diversion box (Moccasin Wash) to the outlet in Two Mile Wash. The pipe shall have leak free joints. The proposed pipe shall meet the required size, general specifications, load bearing, and compaction requirements for the installation. The Contractor shall provide all connectors, pipe and covers for pipeline clean-outs.

2.3.4. Measurement and Payment

See Paragraph 2.1.4. for measurement and payment for furnishing and placing riprap.

Payment for excavation and furnishing and installing of the diversion pipeline will be made at the lump sum price bid therefor in the schedule. With the exception of furnishing and placing riprap, this lump sum price will include all materials, labor, equipment, and incidentals required to complete the work as specified in this paragraph.

SECTION 2.4--WASH RESTORATION

2.4.1. General

a. This Section covers the Two Mile Wash Restoration.

2.4.2. Wash Restoration

a. The Two Mile Wash restoration consists of: excavating and stockpiling liner material; excavating wash to dimensions shown in drawings X-300-2130 through X-300-2133A; abandonment of existing drain; and installation of a new drain.

b. The Contractor should anticipate excavating approximately 6800 cubic yards of material. The Contractor shall carry excavated material from the impoundment. Dozing or grading shall not be permitted within the impoundment. The Contractor shall place and level spoils in the upland area (not to scale) identified in drawing X-300-2130.

c. The Contractor shall remove and properly dispose of the operator of the existing low water drain. The existing pipe shall be plugged with bentonite or other acceptable material.

d. For installation of the drain, the Contractor shall excavate the trench; provide safe access and mechanical support for pipeline installation crews; backfill; and compact the trench. Support includes, but is not limited to, delivering pipe to the trench, mechanically lowering pipe, and other support necessary to efficiently install the pipe

e. The Contractor shall supply and place a riprap apron at the drain outlet in Two Mile Wash.

2.4.3. Materials

a. Riprap requirements as specified in Paragraph 2.1.3. apply.

b. The Contractor shall provide and install 18-inch galvanized corrugated metal pipe; anti-seep collars; and trash rack as shown in drawing X-300-2137.

2.4.4. Measurement and Payment

See Paragraph 2.1.4. for measurement and payment for furnishing and placing riprap.

Payment for excavating and stockpiling liner material; excavating the existing wash; abandoning existing drain, and furnishing and installing of a new drain will be made at the lump sum price bid therefor in the schedule. With the exception of furnishing and placing riprap, this lump sum price will include all materials, labor, equipment, and incidentals required to complete the work as specified in this paragraph.

DIVISION 3--EARTHWORK

SECTION 3.1--EARTHWORK, GENERAL

3.1.1. Compacting Earth Materials

a. General.--Where compacting of earth materials is required, the material shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing, moistening, and compacting operations shall be such that the material will be uniformly compacted and will be homogeneous, free from lenses, pockets, streaks, voids, laminations, or other imperfections.

b. Compacting clayey and silty materials.--Where compaction of earth materials containing appreciable amounts of clay or silt is required, the materials shall be deposited in horizontal layers. The thickness of each horizontal layer after compaction shall be not more than 6 inches. The excavating and placing operations shall be such that the materials, when compacted, will be blended sufficiently to secure the highest practicable density, lowest permeability, and highest shear strength.

Prior to and during compaction operations, the materials shall have a moisture content of not greater than 2 percentage points wet or less than 2 percentage points dry of optimum moisture content as determined by the Contracting Officer, and the moisture content shall be uniform throughout each layer.

The optimum moisture content is defined as that moisture content which will result in the laboratory maximum dry density of the soil when subjected to laboratory compaction test procedures of ASTM D1557 (1998): Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort.

Insofar as practicable, as determined by the Contracting Officer, moistening of the material shall be performed at the site of excavation; but if necessary, such moistening shall be supplemented by sprinkling at the site of compaction. If the moisture content is less than optimum for compaction by more than 2 percentage points or is greater than optimum for compaction by more than 2 percentage points, the compaction operations shall not proceed, except with the specific approval of the Contracting Officer, until the material has been wetted or allowed to dry out, as may be required, to obtain a moisture content within the tolerances permitted above, and no adjustment in price will be made on account of any operations of the Contractor in wetting or drying the materials or on account of any delays occasioned thereby.

When the material has been conditioned as specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas, such as under pipe, they shall be equipped with suitably shaped heads to obtain the required density.

The dry density of the portion of the soil passing the No. 4 sieve in the compacted material shall not be less than 95 percent of the laboratory maximum dry density as determined by ASTM D1557.

c. Compacting cohesionless materials.--

(1) Compacting cohesionless free-draining materials.--Where compaction of cohesionless free-draining materials, such as sands and gravels, is required, the materials shall be deposited in horizontal layers and compacted to the relative density specified below. The excavating and placing operations shall be such that the materials, when compacted, will be blended sufficiently to secure the highest practicable density and highest shear strength. Water shall be added to the materials as may be required to obtain the specified density by the method of compaction being used.

The thickness of the horizontal layers after compaction shall not be more than 6 inches if compaction is performed by hand or power tampers or rollers; not more that 12 inches if compaction is performed by treads of crawler-type tractors, surface vibrators, or similar equipment; and not more than the penetrating depth of the vibrator if compaction is performed by internal vibrators.

The relative density of the compacted material shall not be less than 70 percent, as determined by ASTM D4253: Standard Test for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table and ASTM D4254 (1991): Standard Test for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density. The relative density is determined by the following formula, wherein the maximum density is the highest density of the soil, minimum density is the lowest density of the soil, and in-place density is the density of the minus 3-inch fraction or portion of the soil in place. Tests for moisture content are made on the materials and the densities are expressed in terms of ovendry weights.

$$\text{Rel. Den. (\%)} = \frac{\text{max. den. x (in-place den.-min. den.)}}{\text{in-place den. x (max. den.-min. den.)}} \times 100$$

(2) Compacting cohesionless materials containing some clay and silt.--Cohesionless materials containing clay and silt may not be free draining. When compaction of cohesionless materials containing clay and silt is required, the materials shall be compacted to a dry density in accordance with either subparagraph (a) or (b) below, using whichever test that results in the higher dry density of the compacted material in the placement.

(a) Dry density using ASTM laboratory compaction test as prescribed in subparagraph b. above.--Prior to and during compaction operations, the materials shall have a moisture content of not greater than 2 percentage points wet or less than 4 percentage points dry of optimum moisture, as determined by the Contracting Officer, and the moisture content shall be uniform throughout each layer: Provided, that for materials being compacted that have a moisture content of not greater than 2 percentage points wet or less than 2 percentage points dry of optimum moisture, the dry density of the soil fraction in the compacted material shall not be less than 95 percent of the laboratory maximum soil dry density, as determined by

ASTM D1557 laboratory compaction test; and that for materials being compacted that have a moisture content between 2 and 4 percentage points dry of optimum moisture, the dry density of the soil fraction in the compacted material shall not be less than 98 percent of the laboratory maximum soil dry density, as determined by ASTM D1557 laboratory compaction test.

(b) Dry density using the relative density test as prescribed in subparagraph c.(2)(a) above.--The relative density of the compacted material shall not be less than 70 percent as determined by ASTM D4253 and ASTM D4254.

Except as otherwise provided for moisture content in subparagraph c.(2)(a) above., the materials shall be moistened, placed, and compacted in accordance with subparagraph b. above, when density is determined by ASTM's laboratory compaction test. When density is determined by the relative density test, the materials shall be moistened, placed, and compacted in accordance with subparagraph c.(1) above.

d. Costs.--The cost of compacting earth materials as described in this paragraph, including furnishing water and moistening the materials, shall be included in the respective lump sum prices bid in the schedule for items requiring earthwork.

SECTION 3.2--EXCAVATION

3.2.1. Excavation, General

a. General.--The Contractor shall perform all excavation required under these specifications for installation of a diversion pipeline, a precast concrete diversion box, an infiltration gallery and manifold piping system, and removal of silt and sand from a small water impoundment area (a stock pond) in accordance with this paragraph and paragraphs in SECTION 3.2--EXCAVATION, inclusive.

Material to be excavated will not be classified for payment. Bidders and the Contractor must assume all responsibility for deductions and conclusions as to the nature of the materials to be excavated, and the difficulties of making and maintaining the required excavations.

Excavation shall be made to the lines, grades, and dimensions prescribed in the various paragraphs of these specifications and as shown on the drawings.

The Government does not represent that the excavations performed under these specifications can be made to or maintained at the assumed excavation lines shown on the drawings or described in these specifications.

All necessary precautions shall be taken to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. Any damage to the work due to the Contractor's operations shall be repaired at the expense of and by the Contractor. Material beyond the required or prescribed excavation lines which is loosened by the Contractor's operations shall be removed by and at the expense of the Contractor.

b. Additional excavation.--Where additional excavation is prescribed by the Contracting Officer to remove unsuitable foundation material, all earthwork and concrete required due to such additional excavation shall be in accordance with the applicable requirements of these specifications for excavation, backfill, and compacting backfill.

c. Overexcavation.--Except as ordered in writing by the Contracting Officer, excess excavation or overexcavation performed by the Contractor beyond the required or prescribed excavation lines for any purpose or reason, and backfilling, compacting of backfill, and concrete work occasioned thereby shall be at the expense of the Contractor.

If at any point in the excavation, material is excavated beyond the established excavation lines, the overexcavation shall be filled with select materials approved by the Contracting Officer and compacted in accordance with Paragraph 3.1.1. (Compacting Earth Materials); or if at any point in such excavation the foundation material is disturbed or loosened during the excavation process or otherwise, it shall be removed and replaced with select materials approved by the Contracting Officer and the select materials shall be compacted in accordance with Paragraph 3.1.1. (Compacting Earth Materials). The Contractor will not be required to fill any areas of overexcavation in the water impoundment portion of the work, however no additional payment will be made for overexcavation or the removal and disposal of excavated spoil.

d. Excavated materials.--Excavated materials which are unsuitable for or are in excess of embankment, backfill, or other earthwork requirements, as determined by the Contracting Officer, shall be wasted as provided in Paragraph 3.2.3. (Disposal of Excavated Materials).

e. Surfaces of excavation.--The surfaces of excavation upon or against which concrete is to be placed shall be finished to the dimensions shown on the drawings or prescribed by the Contracting Officer, and the surfaces as prepared shall be moistened with water and tamped or rolled with suitable tools or equipment to form compact foundations upon or against with to place the concrete.

Where concrete is to be placed directly upon or against rock surfaces, the excavation shall be sufficient at all points to provide for minimum dimensions of concrete shown on the drawings, and the required minimum dimensions of concrete shall be exceeded as little as possible.

3.2.2. Excavation for Diversion Pipeline Trench and Precast Concrete Diversion Box

a. General.--The Contractor shall excavate the diversion pipeline trench for installation of pipe of the size and type specified on the drawings. The trench shall be excavated to the lines shown on the drawings or as directed by the Contracting Officer. At the location indicated on the drawings, the Contractor shall excavate for placement of precast concrete diversion box.

b. Foundation.--When the foundation material below the bottom of the pipeline and precast concrete diversion box is unsuitable, as determined by the Contracting Officer, the Contractor shall overexcavate and replace the overexcavation with compacted backfill. The backfill shall be placed and compacted as specified in Paragraph 3.1.1. (Compacting Earth Materials). If at any point in excavation, the foundation material is excavated beyond the lines required to

receive the pipe or the precast concrete diversion box, the overexcavation shall be filled with suitable materials and compacted in accordance with Paragraph 3.1.1. (Compacting Earth Materials).

c. Payment.--No direct payment will be made to the Contractor for excavation and the cost of excavation for the diversion pipeline trench and precast concrete diversion box shall be included in the applicable prices bid in the schedule for which the excavation was performed.

3.2.3. Disposal of Excavated Materials

Suitable material from required excavations, or as much thereof as may be needed, as determined by the Contracting Officer, shall be used for backfill about the diversion pipeline, the infiltration gallery and pipe manifold, the concrete cutoff walls, and the precast concrete diversion box. Excess earth material removed in excavation and earth material not suitable for backfill shall be hauled to the location shown on the map and leveled to match the existing terrain.

The cost of all work described in this paragraph shall be included in the unit prices bid in the schedule for items which require excavation.

SECTION 3.3--BACKFILL

3.3.1. Backfill in Diversion Pipeline Trench, Precast Concrete Diversion Box, and Infiltration Gallery

a. General.--The Contractor shall place backfill material in diversion pipeline trench and about precast concrete diversion box which were excavated in accordance with Paragraph 3.2.2. (Excavation for Diversion Pipeline Trench and Precast Concrete Diversion Box).

Reference in this paragraph to backfill in diversion pipeline trenches includes aggregate base material and select material obtained from excavation for communication conduit trenches and aggregate base material and select material obtained from commercial sources.

Gradation limits for select material for backfill shall be evenly distributed within the range of 100 percent passing the 3/4-inch size screen and not more than 5 percent passing the No. 200 screen.

Gradation limits for aggregate base material for backfill shall meet the requirements specified in Paragraph 3.1.3. (Aggregate Base).

All backfill shall be carefully placed and spread in uniform layers so that all voids will be filled. Aggregate base material above the compacted select material may be placed as soon as compacting of the select fill material has been completed. Should compaction tests indicate insufficient density of the compacted select material about the diversion pipeline, the

Contractor will be required to continue compacting the backfill materials until the proper densities are obtained.

No direct payment will be made to the Contractor for backfill in the diversion pipeline trench, and the cost of backfill in the diversion pipeline trench shall be included in the applicable prices bid in the schedule for which the backfill was performed.

3.3.2. Compacting Backfill in Diversion Pipeline Trench, Precast Concrete Diversion Box, and Infiltration Gallery

a. General.--Backfill shall be compacted as shown on the drawings, as specified in this paragraph, or as directed.

b. Location of compacted backfill.--

(1) Select backfill material and aggregate base material in the diversion pipeline trench and about the structures shall be compacted to the densities specified in Paragraph 3.1.1. (Compacting Earth Materials) and as shown on the drawings.

(2) Select material and aggregate base material about the precast concrete diversion box shall be compacted to the densities specified in Paragraph 3.1.1. (Compacting Earth Materials) and as shown on the drawings.

c. Compacting backfill.--Backfill in diversion pipeline trench shall be compacted in layers having about the same top elevation on both sides of the pipeline to prevent unequal loading and displacement of the conduit. All compacted backfill shall be free from voids or loose material. Select material shall be compacted by saturation and internal vibration. Temporary bulkheads shall be used to control the water where required to facilitate compaction of select material.

No direct payment will be made for compacting backfill in and the cost thereof shall be included in the applicable prices bid in the schedule for which the compaction of backfill is performed.

DIVISION 4--CONCRETE

SECTION 4.1--CONCRETE CONSTRUCTION, GENERAL

4.1.1. Concrete Construction, General

All cast-in-place concrete construction shall conform to this section. The concrete construction includes the placement of two concrete cutoff walls in and existing drainage wash. The concrete cutoff walls are part of the infiltration gallery and manifold pipeline system which collects and delivers water to the diversion pipeline. The diversion pipeline diverts a portion of the normal flow and excess runoff to the adjacent water impoundment area.

These items shall be constructed to the lines, grades, and dimensions shown on the drawings.

The concrete compressive strength at 28 days shall be a minimum of 4,000 psi .

4.1.2. Materials

a. General.--The Contractor shall furnish all materials for use in concrete, including cementitious materials, water, sand, coarse aggregate, and specified admixtures; and shall furnish all reinforcing bars and materials for curing concrete.

b. Cement.--Portland cement shall meet the requirements of ASTM C150 (1998) for type II portland cement and shall meet the low-alkali and false-set limitations specified therein.

c. Water.--Water shall be free from objectionable quantities of silt, organic matter, salts, and other impurities.

d. Sand and coarse aggregate.--Sand and coarse aggregate shall consist of clean, hard, dense, durable, uncoated rock fragments that are free from injurious amounts of dirt, organic matter, and other deleterious substances. Sand and coarse aggregate shall meet all requirements of ASTM C33. Coarse aggregate shall conform to ASTM C33 (1999) gradings for either size No. 467 (1-1/2-inch to No. 4 US standard sieve) or size No. 57 (1 inch to No. 4).

e. Air-entraining admixture.--The air-entraining admixture shall conform to ASTM C260 (1998): Provided, that air-entraining admixture used with type F or G chemical admixture shall be a neutralized vinsol resin formulation.

f. Chemical admixture.--The Contractor may use chemical admixtures which conform to ASTM C494 (1998), type A or D.

g. Reinforcing bars.--Reinforcing bars shall conform to ASTM A615 (1996) or A617 (1996), grade 60, including supplementary requirements.

h. Curing compound--Clear resin base curing compound, CRC-101, and shall conform to the requirements of Water and Power Resources Service "Specifications for Clear Resin Base Curing Compound CRC-101" dated January 1, 1981.

The concrete shall be cured and protected in accordance with Paragraph 4.1.5. (Concrete Placement, Curing, and Protection).

4.1.3. Composition

Unless otherwise directed, the Contractor shall design the concrete mix in accordance with these specifications. Mix designs shall provide for the minimum cementitious materials contents listed in table 4A (Minimum cementitious materials content).

Each mix design shall be submitted to the Contracting Officer for review prior to use of the concrete mix.

The Contracting Officer will test concrete for compliance with specifications and reserves the right to design and adjust the concrete mix proportions.

Air-entraining admixture shall be used in such an amount as will effect the entrainment of from 4 to 6 percent air, by volume, of the concrete as discharged at the placement.

Table 4A. - Minimum cementitious materials content

Nominal maximum size aggregate in concrete	Minimum cementitious materials content without water-reducing admixtures	Minimum cementitious materials content with water-reducing admixtures
1-1/2-inches	565 lb/yd^3	535 lb/yd^3
1 inch	620 lb/yd^3	585 lb/yd^3

The slump of the concrete shall not exceed 3 inches plus or minus 1 inch when placed, nor 5 inches when first mixed.

4.1.4. Batching, Mixing, and Transporting

Concrete shall be manufactured and delivered in accordance with ASTM C94 (1998), "Standard Specification for Ready-Mixed Concrete."

4.1.5. Concrete Placement, Curing, and Protection

No. 5 steel reinforcing bars shall be placed at one foot on centers, each face, each way. Before reinforcement is placed, the reinforcement shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease, or other foreign substances. Reinforcement shall be accurately placed and secured in position so that it will not be displaced during the placing of concrete..

Forms shall be used to shape the concrete to the required lines. Exposed unformed surfaces shall be brought to uniform surfaces and given a reasonably smooth, wood-float or steel-trowel finish as directed.

The temperature of the concrete when it is being placed shall be not more than 90EF and not less than 50EF.

Concrete shall be vibrated until it has been consolidated to the maximum practicable density, is free from pockets of coarse aggregate, and closes snugly against all surfaces of forms and embedded materials.

The concrete shall be cured with water or curing compound. If water cured, the concrete shall be kept continuously moist for at least 14 days after being placed by sprinkling or spraying, or by other methods approved by the Contracting Officer. Curing compound, when used, shall be applied in accordance with the procedures contained in the Eighth Edition - 1981 Revised Reprint of the Bureau of Reclamation "Concrete Manual."

The Contractor shall protect all concrete against injury until final acceptance by the Government. The concrete shall be maintained at a temperature not lower than 50EF for at least 72 hours after it is placed and, if water cured, shall be protected against freezing temperatures for the duration of the curing period. Then after discontinuance of the water curing, this concrete shall be maintained at a temperature of not less than 50EF for 72 hours.

4.1.6. Tolerances for Concrete Construction

a. General.--Structural deviations are defined as allowable variations form specified lines, grades, and dimensions. Allowable variations from specified lines, grades, and dimensions are listed in subparagraph b. below. Surface tolerances are the maximum allowable magnitude of the surface irregularities. Allowable magnitudes for concrete surface irregularities are specified in subparagraph d. below.

The intent of this paragraph is to establish tolerances that are consistent with modern construction practice, yet are governed by the effect that permissible deviations will have upon the structure. The Government reserves the right to diminish the structural deviations and/or surface tolerances set forth herein if such variations impair the structural action, operational function, or architectural appearance of a structure or portion thereof.

Where specific tolerances are not specified or shown on the drawings for a structure, variations shall be those specified for similar work. The Contractor shall be responsible for finishing the concrete and for setting and maintaining concrete forms within the limits necessary to ensure that the completed work will be within the variations specified. Concrete work that does not conform to the limits specified shall be remedied at the expense of and by the Contractor.

b. Structural deviations.--

(1) Variation from level or specified grades for slabs:

(a) When overall length of line or surface is:

Less than 10 feet . . . . . ±1/4 inch
10 to 20 feet, inclusive . . . . . 3/8 inch
More than 20 feet . . . . . ±3/4 inch

(b) For any two successive intermediate points on the line or surface separated by:

10 to 20 feet, inclusive . . . . . ±1/4 inch
More than 20 feet . . . . . ±3/8 inch

c. Concrete surface irregularities.--

(1) General.--Bulges, depressions, and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or "gradual" and are measured relative to the actual concrete surface.

(2) Abrupt surface irregularities.--Abrupt surface irregularities are defined herein as offsets such as those caused by misplaced or loose forms. Abrupt surface irregularities are further defined as isolated irregularities in which the maximum dimension of the irregularity perpendicular to the surface is greater than the maximum dimension of the irregularity in the plane of the surface. Also, abrupt surface irregularities include all incidences of isolated surface irregularities which exceed the gradual irregularity specifications set forth herein.

(3) Gradual surface irregularities.--Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surfaces. Gradual surface irregularities are further defined as isolated undulations on the concrete surfaces. The maximum dimension of the undulation perpendicular to the surface is small relative to the maximum dimension of the undulation in the plane of the surface.

(4) The magnitude of surface irregularities of formwork and finished concrete surfaces shall be checked by the Contractor to ensure that the concrete surfaces are within specified tolerances. The Government will also make such checks of hardened concrete surfaces as determined necessary to ensure compliance with these specifications.

d. Concrete surface tolerances.--The maximum allowable concrete surface irregularity for abrupt irregularities shall be 1/4-inch concrete structures. The maximum allowable concrete surface irregularity for gradual irregularities shall be 1/16-inch/inch for concrete structures.

4.1.7. Finishes and Finishing

a. General. - The classes of finish and the requirements for finishing of concrete surfaces shall be as specified in this paragraph and paragraph 4.1.6. (Tolerances for Concrete Construction) or as otherwise shown on the drawings. Where finishes are not specified or shown on the drawings for a particular structure or surface, the finish shall be as specified for similar work. The Contractor shall notify the Contracting Officer before finishing concrete. Unless inspection is waived in each specific case, finishing of concrete shall be performed only when a Government inspector is present.

Concrete surface variations will be measured by the Government in accordance with paragraph 4.1.6. (Tolerances for Concrete Construction) where necessary to verify that concrete surfaces are within the specified tolerances.

b. Formed surfaces. - The classes of finish for formed concrete surfaces are designated by the symbols F1, F2, and F3. The classes of finish shall apply as follows:

(1) F1. - Finish F1 generally applies to formed surfaces upon or against which fill material, grout, or concrete is to be placed. Form tie rod ends on surfaces which will be in contact with fill material shall be protected from moisture if they will be below the water table or water line. Protection shall consist of recessing the tie rod ends and filling the recesses with dry pack or other approved material or by a waterproofing system approved by the Contracting Officer. Form tie rod ends on surfaces which will be in contact with concrete or form tie rod ends on surfaces which will be in contact with fill material but will be above the maximum water table elevation may be cut off flush with the formed surfaces or may be recessed without filling.

(2) F2. - Finish F2 generally applies to all formed surfaces not permanently concealed by fill material, grout, or concrete, or not required to receive finish F3.

(3) F3. - Finish F3 generally applies to formed surfaces, the appearance of which is considered by the Government to be of special importance, such as surfaces of structures prominently exposed to public view. After all required patching and correction of imperfections have been completed, surfaces shall be sack-rubbed as follows:

Surfaces shall be thoroughly wetted and sack rubbing shall commence while surfaces are still damp. The mortar used shall consist of 1 part cement; 2 parts, by volume, of sand passing a No. 16 screen; and enough water so that the consistency of the mortar is that of thick cream. It may be necessary to blend the cement with white cement to obtain a color that will match that of the surrounding concrete surface.

The mortar shall be rubbed thoroughly over the area with clean burlap or a sponge rubber float so as to fill all pits, bugholes, and other defects. While the mortar in the pits is still plastic, the surface shall be rubbed over with a dry mix of the above proportions and material to remove the excess plastic material and place enough dry material in the pits to stiffen and

solidify the mortar so that the fillings will be flush with the surface. No material shall remain on the surface except that within the pits. Curing of the surface shall then continue as specified.

c. Unformed surfaces. - The classes of finish for unformed concrete surfaces are designated by the symbols U1, U2, and U3. Interior surfaces shall be sloped for drainage where shown on the drawings or directed. Surfaces which will be exposed to the weather and which would normally be level shall be sloped for drainage. Unless the use of other slopes or level surfaces is indicated on the drawings or directed, narrow surfaces, such as tops of walls and curbs, shall be sloped approximately three-eighths inch per foot of width; and broader surfaces, such as walks and roadways, shall be sloped approximately one-fourth inch per foot. Unless otherwise specified or indicated on the drawings, these classes of finish shall apply as follows:

(1) U1. - Finish U1 (screeded finish) generally applies to unformed surfaces that will be covered by fill material, grout, or concrete. Finish U1 is also used as the first stage of finishes U2 and U3. Finishing operations shall consist of sufficient leveling and screeding to produce even uniform surfaces.

(2) U2. - Finish U2 (floated finish) generally applies to unformed surfaces not permanently concealed by fill material, grout, or concrete, or not required to receive finish U1 or U3.

Finish U2 is also used as the second stage of finish U3. Floating may be performed by use of hand- or power-driven equipment. Floating shall be started as soon as the screeded surface has stiffened sufficiently, but before bleed water forms, and shall be the minimum necessary to produce a surface that is free of screed marks and is uniform in texture. If finish U3 is to be applied, floating shall be continued until a small amount of mortar without excess water is brought to the surface, so as to permit effective troweling.

Surfaces to receive finish U2 include unformed surfaces of the following structures:

(a) Cutoff walls for the infiltration gallery structure.

(3) U3. - Finish U3 (troweled finish) generally applies to unformed surfaces, the appearance and porosity of which is considered by the Government to be of special importance. After bleed water has disappeared and when the floated surface has hardened sufficiently to prevent an excess of fine material from being drawn to the surface, steel troweling shall be started. Steel troweling shall be performed with firm pressure so as to flatten the sandy texture of the floated surface and produce a dense uniform surface, free from blemishes and trowel marks.

d. Cost.--The cost of furnishing all materials and performing all work necessary for finishing concrete as specified herein shall be included in the applicable unit price bid in the schedule for items requiring concrete.

SECTION 4.2--PRECAST-CONCRETE STRUCTURES

4.2.1. Precast Concrete Diversion Box

a. General.--Precast concrete diversion box shall be constructed to the nominal dimensions shown on the drawings. A possible source for the precast concrete diversion box could be Jensen Precast Concrete Products, 3853 Losee Road, North Las Vegas, Nevada 89030-3304, (702)-649-0045.

b. Materials.--The precast concrete diversion box shall be fabricated to meet the requirements of ASTM C857 (1995): Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures, and ASTM C858 (1983): Standard Specification for Underground Precast Concrete Utility Structures.

Concrete shall have a minimum compressive strength of 3000 psi at 28 days. Aggregate shall be standard gradation for precast concrete structures and shall not exceed 3/4-inch maximum gradation. Cement shall be Portland cement, type II for moderate sulfate conditions. Reinforcement steel shall be grade 60 steel, no. 4 bars at 12 inches on center, each face, each way. Wall thickness for the precast structure shall be a minimum of 6 inches thick.

Precast structures shall not be moved from the precasting site sooner than 7 days after concrete in the structure is placed, unless otherwise approved by the Contracting Officer. If precast structures are moved before completion of the specified curing period, curing of the concrete shall not be interrupted.

c. Installation.--The Contractor shall install the precast concrete diversion box at the location shown on the drawings and to the required elevations.

The Contractor shall install the precast concrete diversion box in accordance with the manufacturer's instructions, in accordance with industry standards, and in accordance with the safety requirements of Reclamation's publication entitled "Reclamation’s Safety and Health Standards."

d. Payment.---No direct payment will be made to the Contractor for furnishing and installing the precast concrete diversion box. These cost shall be included in the lump sum price bid in the schedule for slope stabilization and access, installation of diversion structures, installation of diversion pipeline.

DIVISION 5 -- DRAWINGS

SECTION 5.1--DRAWINGS

5.1.1. Drawings, General

a. General.--The drawings which form a part of these specifications are the original piping installation drawings. The Government has attempted to verify the accuracy of these drawings, however it is the Contractor's responsibility to insure the accuracy of details that affect the job. In the event there are minor differences as determined by the Contracting Officer between details and dimensions shown on the drawings and those of existing features at the site, the details and dimensions of existing features at the site shall govern.

In accordance with the contract clause at FAR 52.236-21 Specifications and Drawings for Construction, the Contractor shall advise the Contracting Officer of any discrepancies including errors or omissions discovered on any of the drawings.

b. Additional copies of drawings.--The Contractor will be furnished such additional copies of these specifications and drawings as may be required for carrying out the work. Full-size contact prints of the original drawings from which the attached reproductions were made, other than standard drawings (40-D- series), will be furnished to the Contractor for construction purposes upon request. Additional prints of the standard drawings (40-D- series) will be furnished upon request. The number of prints of each drawing furnished to the Contractor will be limited to 2 sets of contact prints and 1 set of reproducibles.

c. Existing installation drawings.--The drawings included herein are existing installation drawings. These drawings are included to show the existing installations.

5.1.2. List of Drawings

The following drawings are made a part of these specifications:

TWO MILE WASH RESTORATION
KAIBAB, ARIZONA

LIST OF DRAWINGS

GENERAL

1.	X-300-2123	Location Map
2.	X-300-2124	Site Plan
3.	X-300-2125	Plan and Details
4.	X-300-2126	Plan and Profile
5.	X-300-2130	Plan
6.	X-300-2131	Cross Sections (1 of 4)
7.	X-300-2132	Cross Sections (2 of 4)
8.	X-300-2133	Cross Sections (3 of 4)
9.	X-300-2133A	Cross Sections (4 of 4)
10.	X-300-2137	Details